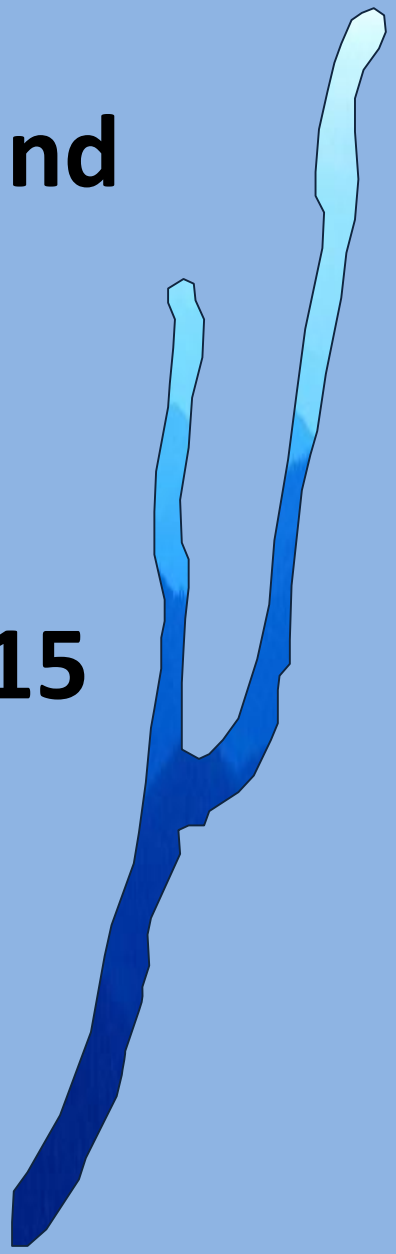
Keuka Lake Looking Back and Looking Ahead

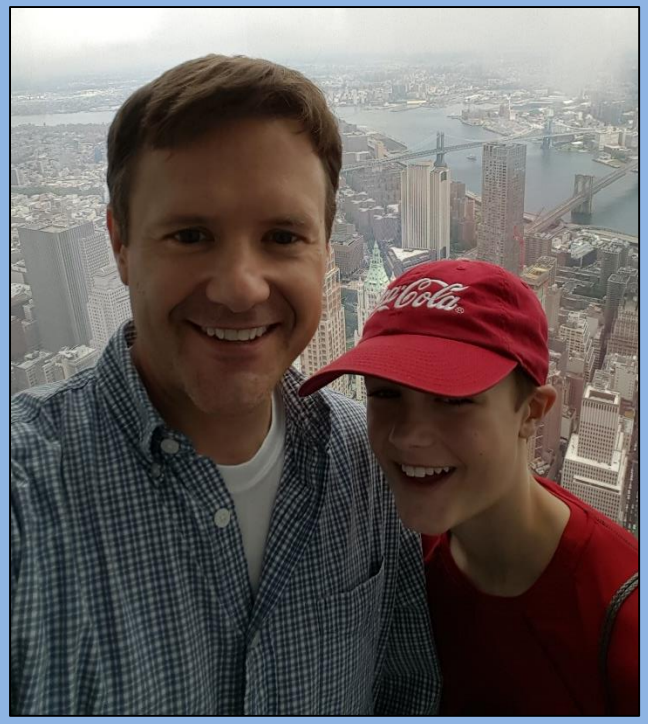
State of the Lake **2014**
Mid-season update for **2015**

Tim Sellers, PhD



Keuka Lake Association
protecting the quality of the lake

Tim Sellers, PhD



KLA Science/Water Quality Advisor

Training
Limnologist / Aquatic Biologist
Research lakes, rivers, oceans

Keuka College
Director, Center for Aquatic Research
Professor of Biology and Environmental Science

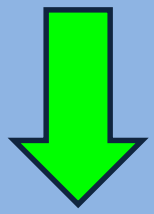
Associate Provost for Academic Innovation

Keuka Lake Association
protecting the quality of the lake

Talk Outline

- State of the lake 2014
  - Updates with long term history
- It's not all fun and games
- Submersible Probe
  - Variation under the waves
  - Blue-green algae (new data!)
- Conclusions

2014 State of Keuka Lake

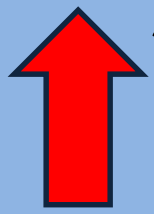


*Nutrient levels (**Phosphorus**)*

- *Averaged 3.9 ppb, **down** 2.6 ppb from 2013,*
- *Well below long-term average of 7.3 ppb*

Water clarity

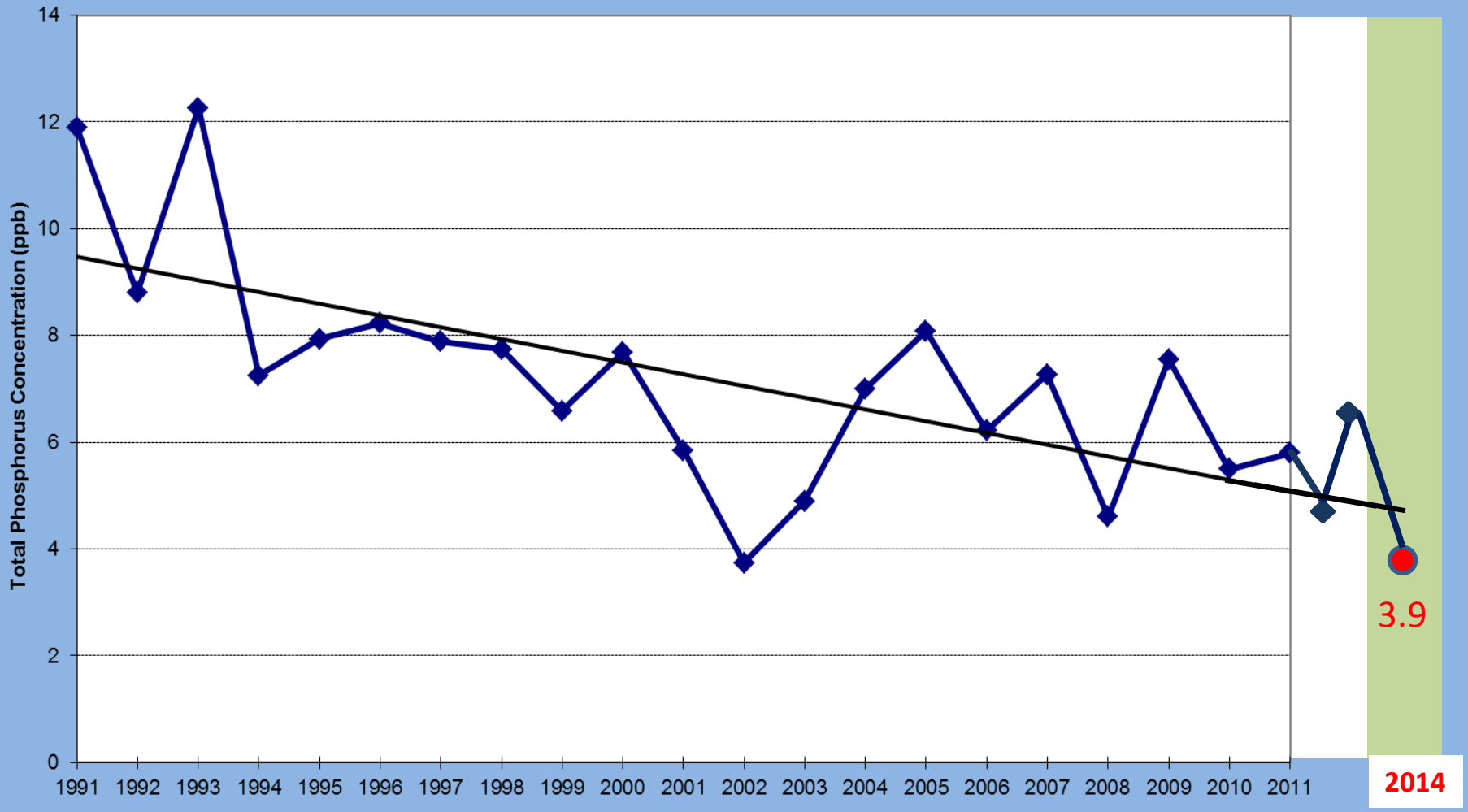
- *Averaged 7.8 m, similar to 2013 levels*
- *1.7 m above the long-term average of 6.1 meters*

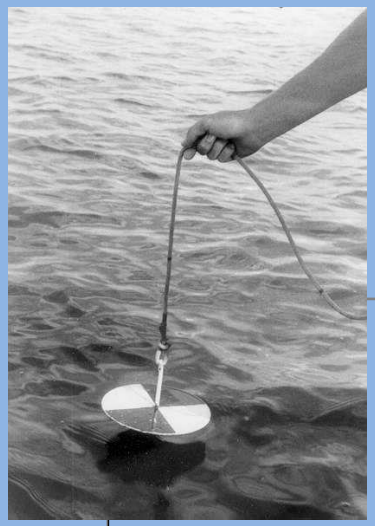


*Algae levels (**Chl a**)*

- *averaged **1.62** ppb, **up** 0.9 from 2013*
- *Below the long-term average of 2.6 ppb*

Keuka Lake Phosphorus Trends

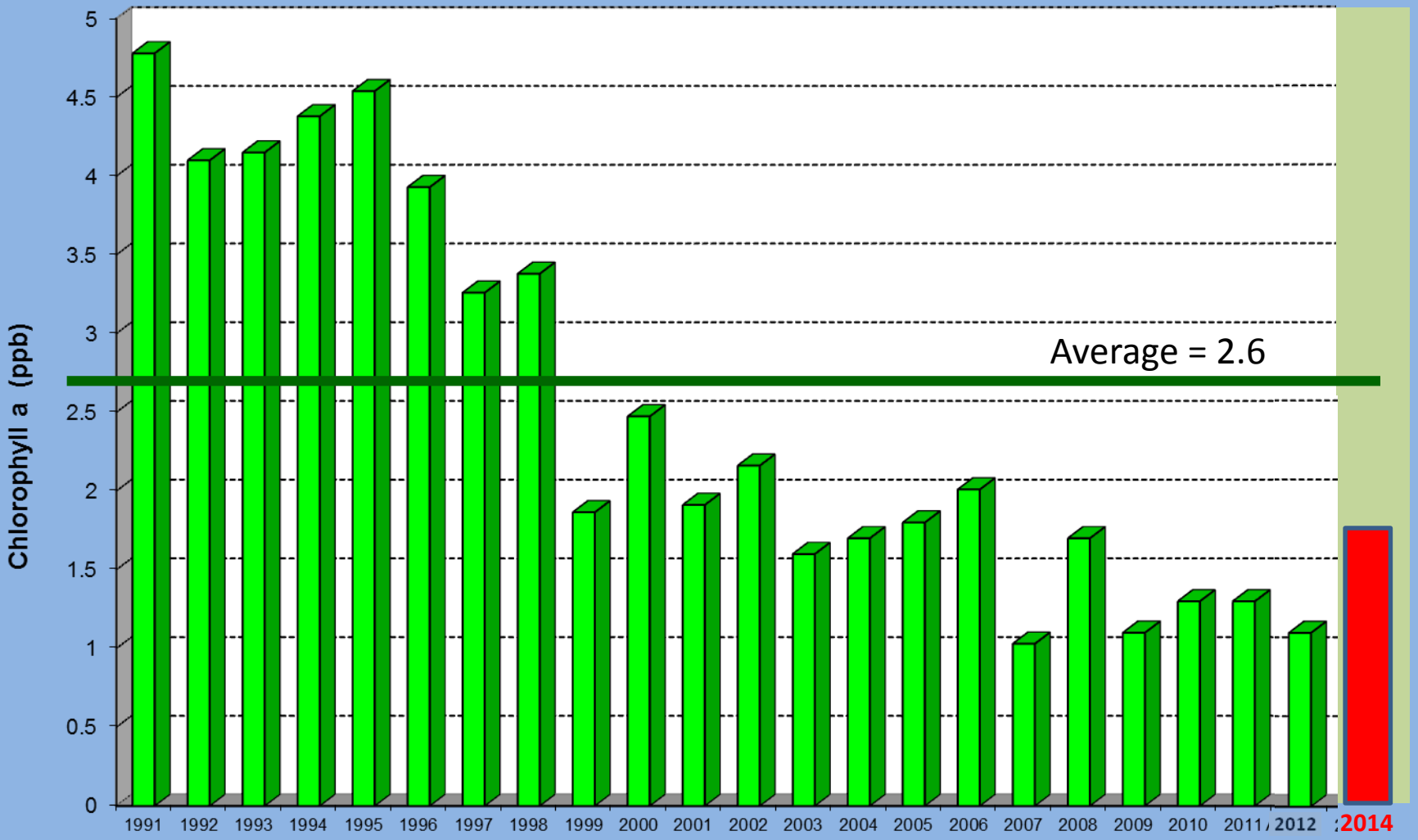


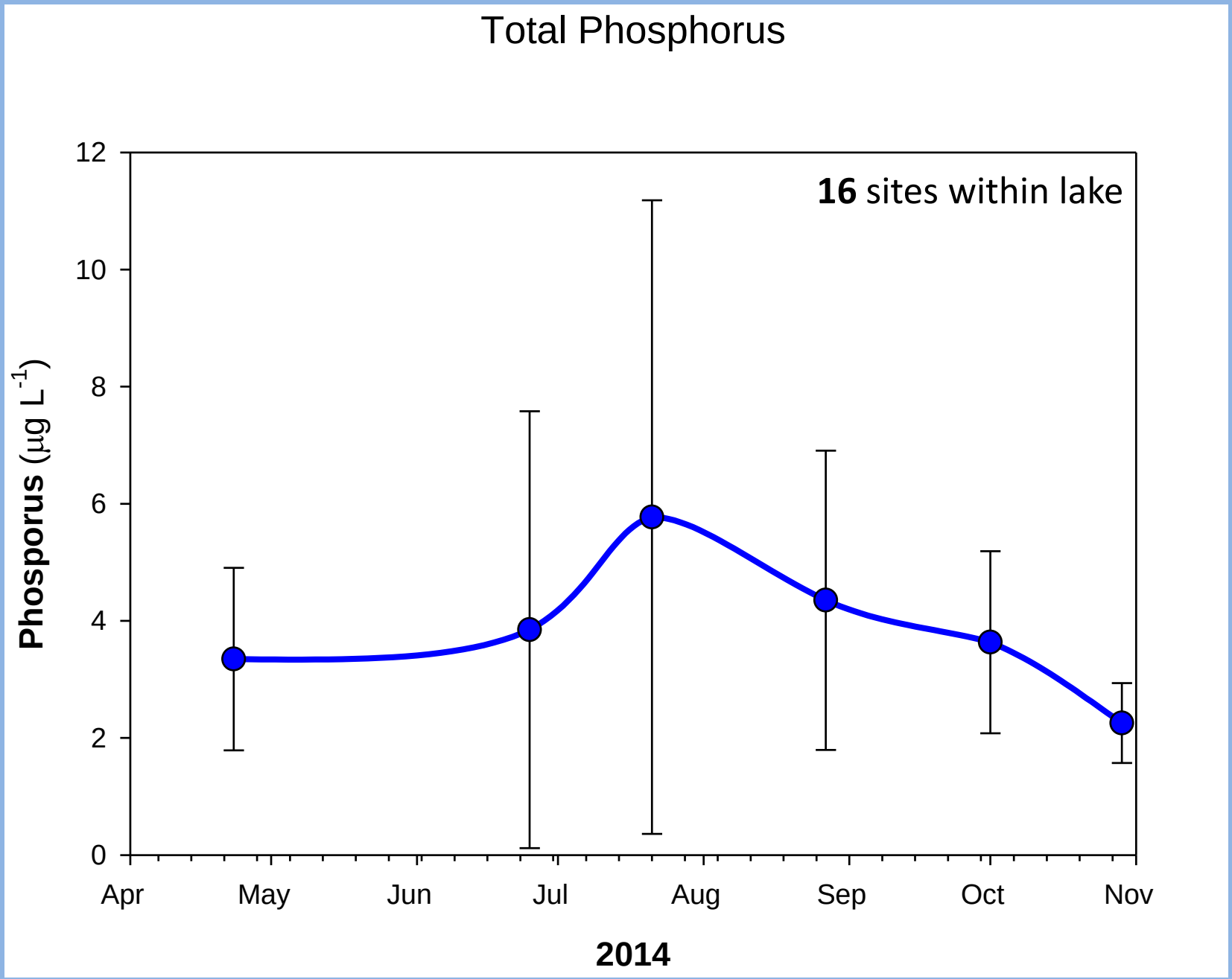


Keuka Lake Secchi Disk Data

SD
Trendline
$R^2 = 0.3117$
Depth in Meters
0
2
4
6
8
7.8
2014
Date
9/19/1991
2/16/1992
7/15/1992
12/12/1992
5/11/1993
10/8/1993
3/7/1994
8/4/1994
1/1/1995
5/31/1995
10/28/1995
3/26/1996
8/23/1996
1/20/1997
6/19/1997
11/16/1997
4/15/1998
9/12/1998
2/9/1999
7/9/1999
12/6/1999
5/4/2000
10/1/2000
2/28/2001
7/28/2001
12/25/2001
5/24/2002
10/21/2002
3/20/2003
8/17/2003
1/14/2004
6/12/2004
11/9/2004
4/8/2005
9/5/2005
2/2/2006
7/2/2006
11/29/2006
4/28/2007
9/25/2007
2/22/2008
7/21/2008
12/18/2008
5/17/2009
10/14/2009
3/13/2010
8/10/2010
1/7/2011
6/6/2011
11/3/2011
4/1/

Keuka Lake Chlorophyll *a* (= algae)




Total Phosphorus
16 sites within lake
Phosporus (µg L-1)
12
10
8
6
4
2
0
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
2014

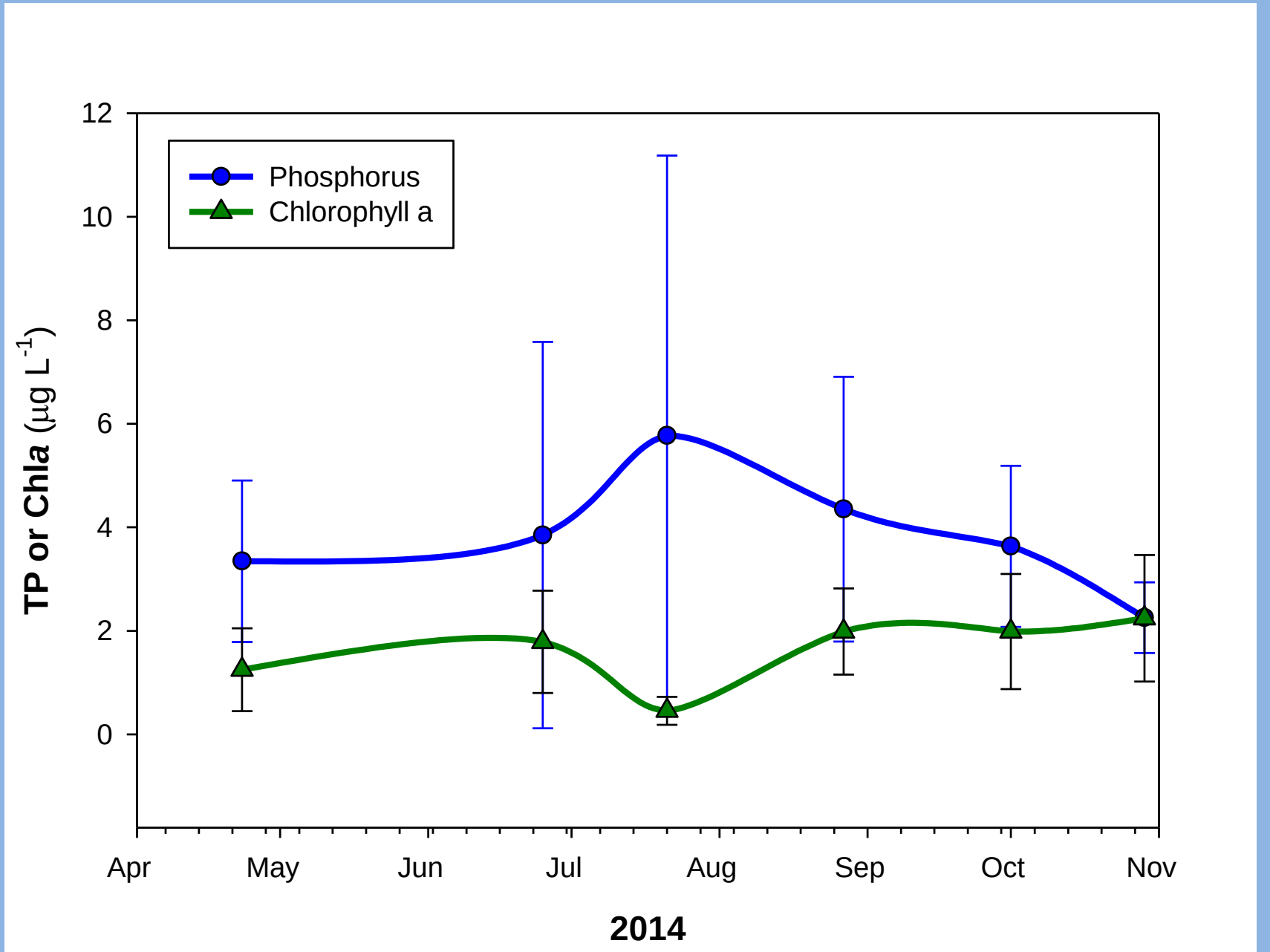
Chlorophyll *a*

Chlorophyll *a* (µg L^{-1})

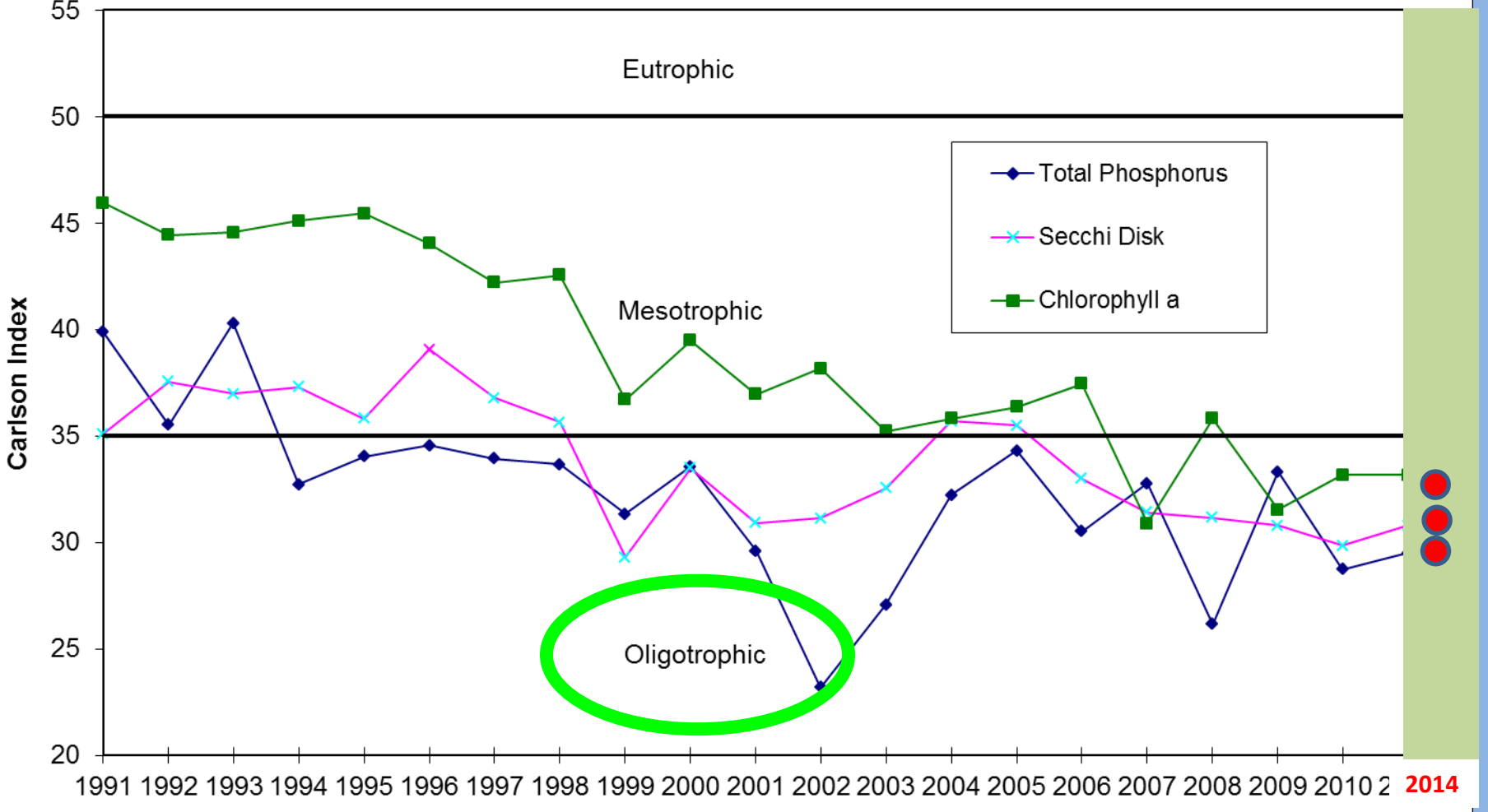
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0

Apr May Jun Jul Aug Sep Oct Nov

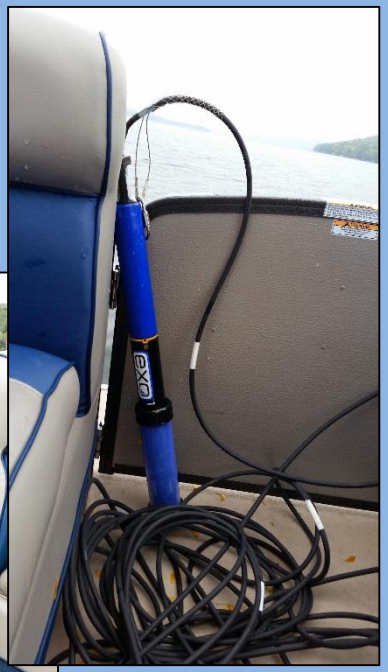
2014


Phosphorus
Chlorophyll a
TP or Chla (µg L-1)
12
10
8
6
4
2
0
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
2014

Keuka Lake Trophic Status



Submersible Water Quality Probe



Depth
Temperature
Chlorophyll *a* (= algae)
Cyanobacteria (= blue green algae)
pH
Conductivity (= salts)

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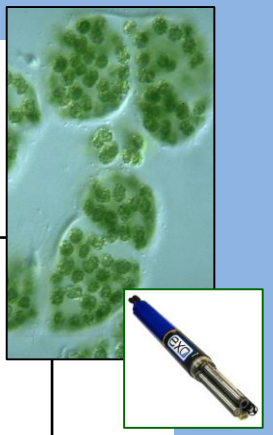
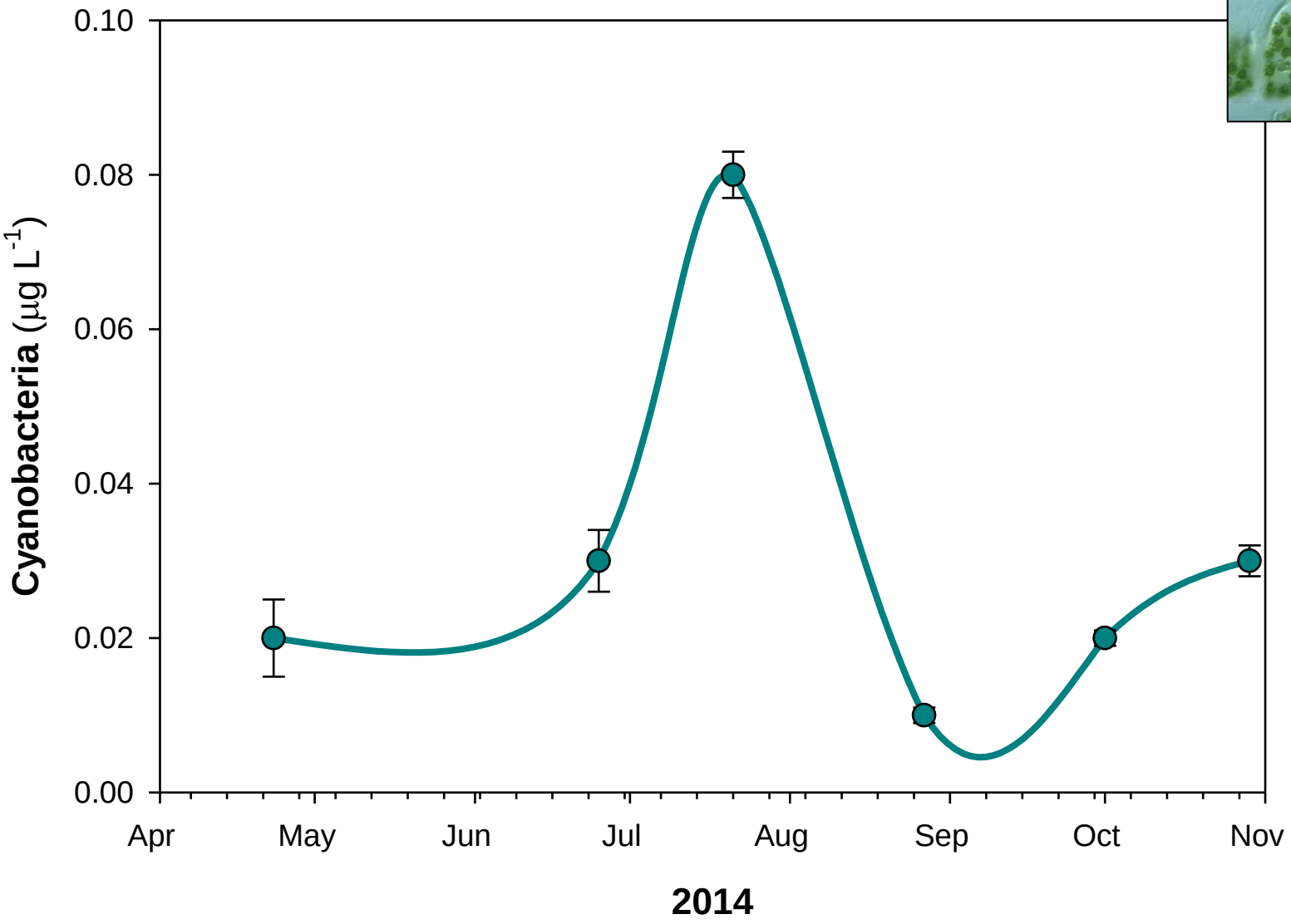
Cyanobacteria (= Blue green algae)

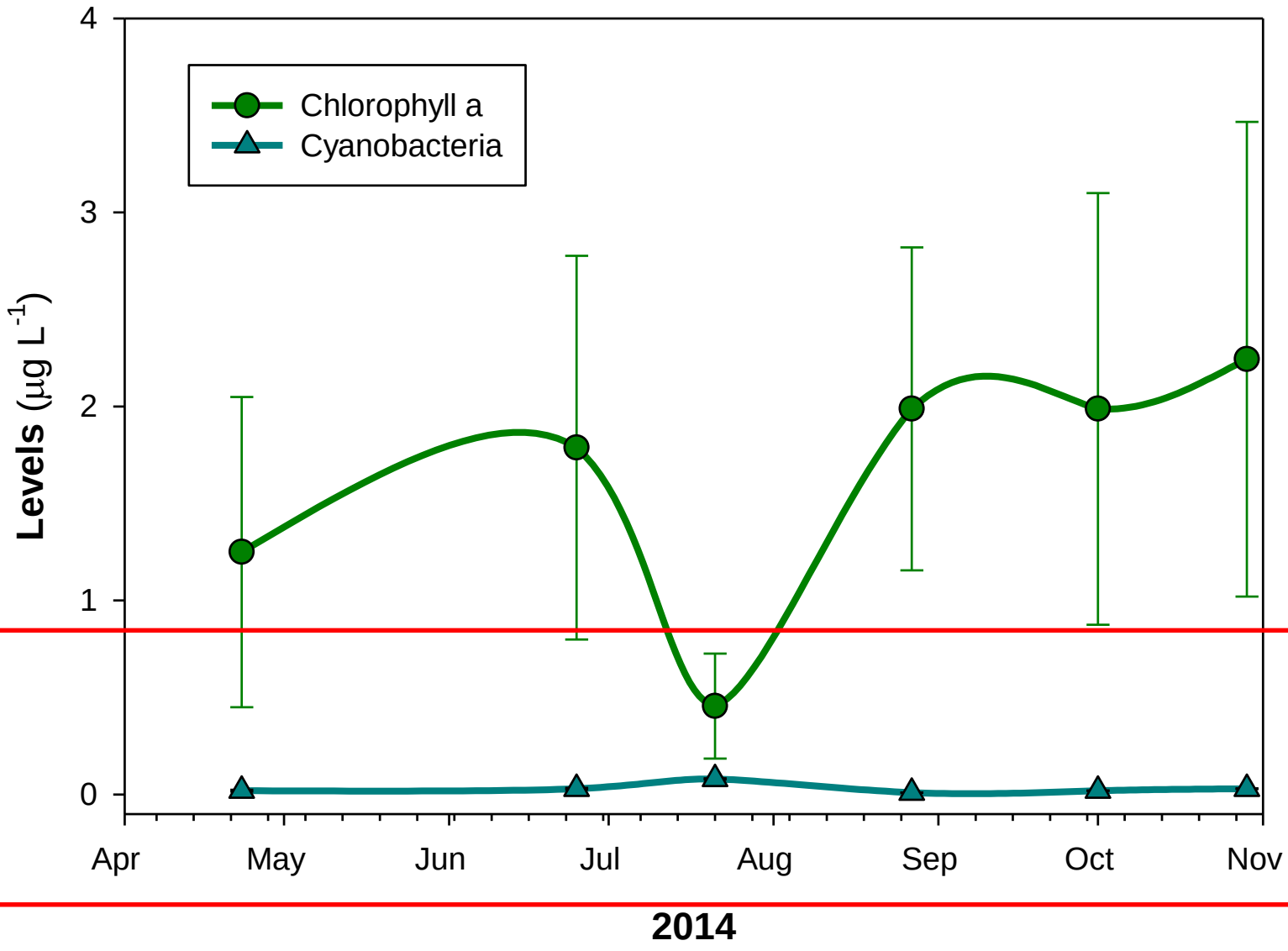
- Type of phytoplankton / algae
- Generally inhabits **surface** (not deep)
  - Reduces light in lake: bad for good algae
- Many species
  - Most harmless
  - *Some* produce **toxic chemicals**
- **Very LOW levels in Keuka!**
- Probe allows instant sample

Cyanobacteria Levels ("Bluegreen algae")





"Good" versus "Bad" Algae



State of the Lake

- 2014 data show the lake is in generally **good health**
- **Improving trends** in many important parameters (*water clarity*, *phosphorus*)
- Cyanobacteria levels continue to be **low** (but present!)
- May 2014 storm dumped a lot of phosphorus in lake but we saw **little algae** growth resulting in 2014
  - Some increased macrophytes (seaweed)
  - Very little cyanobacteria (*Microcystis*)
  - Still waiting for blooms ("aftershocks")

Thank you for your dedication to protecting Keuka Lake!

- Continue to the “Listen to the Lake”
- “If not now, *when*? If not us, *who*?”

- Contact me:

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